

Slide 1

## Electrical Requirements of the 2003 International Building Code

---

---

---

---

---

---

---

---

Slide 2

### 201 Administration

- CT has not adopted the ICC Electrical Code
  - Any reference to the ICC Electrical Code are references to the 2005 NEC

---

---

---

---

---

---

---

---

Slide 3

### 105 Permits

- Owner or agent of owner to apply
- Repairs exempt from permits:
  - Lamping
  - Repair of cord connected appliances
- Emergency work:
  - Requires permit the next working business day

---

---

---

---

---

---


---

---

Slide 4

111 Service utilities

- Cannot connect to the utility without prior permit from the BO
- Building Official has the authority to order the disconnection of the service utility from any building in cases of emergency



---

---

---

---

---

---

---

---


---

---

Slide 5

HERMAN®

by Jim Unger



© LaughingStock International Inc. d/b/a, by United Media, 2003

"I'll let you decide, but they said the electricity will be off for at least an hour."

---

---

---

---

---

---

---

---

---

---

Slide 6

402 Covered Malls

- Malls exceeding 50,000 square feet require :
  - an emergency voice/alarm communication system
  - Standby power system to operate the voice alarm system

---

---

---

---

---

---

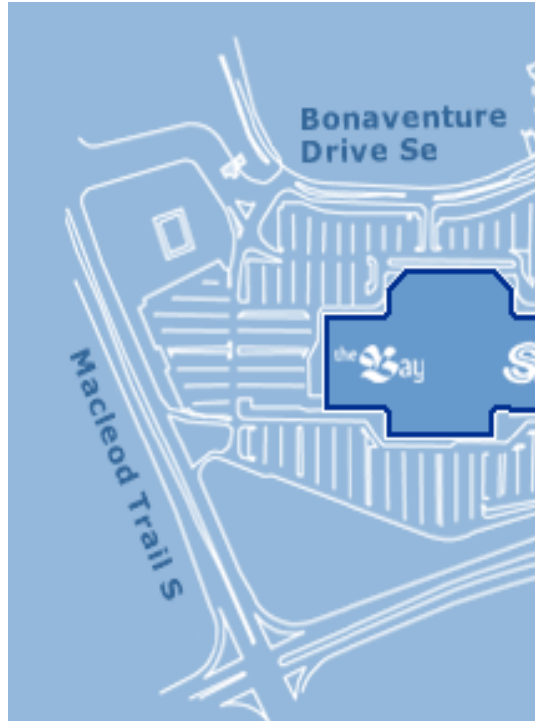
---

---

---

---

Slide 7



---

---

---

---

---

---

---

Slide 8

403 High Rise Buildings

- High Rise buildings require :
  - Standby power system to operate:
    - Fire command center
    - Fire pumps
    - Smokeproof ventilation
    - Elevators
  - Fire department communication system for fire department use

---

---

---

---

---

---

---

Slide 9



---

---

---

---

---

---

---

---

---

---

Slide 10

### 403 High Rise Buildings

- High Rise buildings require :
  - Emergency power system to operate:
    - Exit and egress lighting
    - Elevator car lighting
    - emergency voice/alarm communication systems
    - Automatic fire alarm systems
    - Fire alarm systems

---

---

---

---

---

---

---

---

---

---

Slide 11



---

---

---

---

---

---

---

---

---

---

Slide 12

### 404 Atriums

- Smoke control equipment shall be connected to a standby power system
- A fire alarm system shall be installed in occupancies with an atrium that connects more than 2 stories
- Atriums in occupancy groups A, E, or M shall be provided with an emergency voice/alarm communication system

---

---

---

---

---

---

---

---

Slide 13



---

---

---

---

---

---

---

---

Slide 14

### 405 Underground Buildings

- If lowest level of a structure is 60 feet or deeper below the lowest level of exit discharge, a manual Fire Alarm system is required throughout the structure
- Public address system is always required for occupied building portions 30 feet below the lowest level of exit discharge

---

---

---

---

---

---

---

---

Slide 15

405 Underground Buildings

- Standby power shall be provided for:
  - Smoke control system
  - Ventilation and smoke detection systems for smokeproof enclosures
  - Fire pumps

---

---

---

---

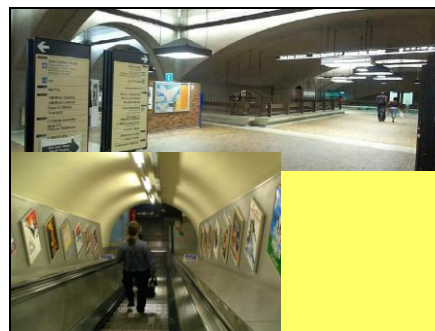
---

---

---

---

Slide 16



---

---

---

---

---

---

---

---

Slide 17

405 Underground Buildings

- Emergency power shall be provided for:
  - Emergency voice/alarm communication systems
  - Fire alarm systems
  - Automatic fire detection systems
  - Elevator car lighting
  - Means of egress lighting and exit illumination

---

---

---

---

---

---

---

---

Slide 18

#### 406 Motor vehicle related

- Enclosed parking garages and repair garages
  - Shall be mechanically ventilated
- Repair garages for hydrogen and LNG vehicles
  - Shall be provided with an approved flammable gas detection system

Slide 19



Slide 20

#### 407 I-2

##### Nursing Homes, detox. facilities

- Corridors shall be protected by an automatic fire detection system
- Exceptions:
  - Where patient rooms have smoke detectors and visual alarms
  - Where patient rooms are equipped with automatic door closers with integral smoke detectors

Slide 21

408 I-3  
Prisons and Jails

- Remote release of locks on doors in a means of egress shall be required
  - Exception when not more than 10 locks are required to be unlocked
- Power operated doors shall have manual release and emergency power or remote mechanical release
  - Exception for emergency power when not more than 10 locks are required to be unlocked

---

---

---

---

---

---

---

---

Slide 22



---

---

---

---

---

---

---

---

Slide 23

409 Motion Picture Projection  
Rooms

- Controls are required for the auditorium and means of egress lighting systems of theaters from:
  - Inside the projection room
  - One other convenient location in the building

---

---

---

---

---

---

---

---



Slide 24



---

---

---

---

---

---

---

---

---

---

Slide 25

**411 Special amusement buildings**

- Shall be equipped with an automatic fire detection system
- Activation of a single smoke detector, the sprinkler system or other fire detectors shall immediately sound an alarm at a constantly attended location.

---

---

---

---

---

---

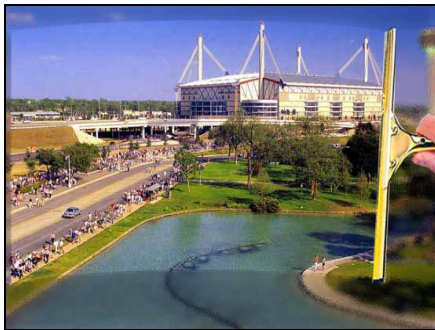
---

---

---

---

Slide 26



---

---

---

---

---

---

---

---

---

---

Slide 27

#### 411 Special amusement buildings

- An emergency voice/alarm system is required audible throughout the entire building
- Exit signs shall be installed at the required exit or exit access doors
  - Directional exit marking shall also be provided

---

---

---

---

---

---

---

---

Slide 28

#### 411 Special amusement buildings

- Where mirrors, mazes or other designs that disguise the path of egress travel:
  - Approved low-level exit signs and directional path markings shall be provided
    - Located not more than 8 inches above the walking surface
    - Located on or near the path of egress travel
  - Such markings shall become visible in an emergency
    - Shall be activated by the automatic fire detection system and the sprinkler system

---

---

---

---

---

---

---

---

Slide 29

#### 412 Aircraft related

- Traffic control towers shall have automatic fire detection systems
- Standby power system shall be provided for towers over 65 feet:
  - Mechanical equipment
  - Lighting
  - Elevators
  - Fire alarm and smoke detector systems

---

---

---

---

---

---

---

---

Slide 30



---

---

---

---

---

---

---

---

Slide 31

412 Aircraft related

- Unit heaters in:
  - hangars shall be at least 10 feet above the highest wing surface or engine enclosure of the type of aircraft permitted
  - Shops, offices and other parts shall be at least 8 feet above the floor

---

---

---

---

---

---

---

---

Slide 32



---

---

---

---

---

---

---

---

Slide 33

#### 412 Aircraft related

- Residential aircraft hangars shall have smoke detectors
  - Shall be interconnected to the smoke alarm or sounding device in the dwelling
    - Shall be audible in all sleeping areas of the dwelling

---

---

---

---

---

---

---

---

Slide 34

#### 414 Hazardous Materials

- Automatic fire detection required
- Where ventilation, treatment, temperature control, alarm or detection systems are required, an emergency or standby power systems is also required

---

---

---

---

---

---

---

---

Slide 35

#### 414 Hazardous Materials

- Emergency alarms for detection and notification of an emergency condition shall be provided
- A manual emergency alarm shall be provided in areas used for storage of hazardous materials
  - Emergency alarm initiating devices shall be installed outside of each interior exit or exit access

---

---

---

---

---

---

---

---

Slide 36

#### 414 Hazardous Materials

- Corridors or exit enclosures where hazardous materials ranked 3 or 4 by NFPA 704 are transported shall have at 150 foot intervals:
  - an emergency telephone system
  - A local manual alarm system, or
  - An approved alarm initiating device

---

---

---

---

---

---

---

---

Slide 37

#### 415 Hazardous areas

- H-5 Fabrication areas
  - The NEC requirements for hazardous locations need not be applied where the air change is at least:
    - Four cubic feet per minute per square foot of floor area on average and
    - Three cubic feet per minute per square foot of floor area at any location

---

---

---

---

---

---

---

---

Slide 38

#### 415 H-5 Hazardous areas

- Exit access corridors shall have at 150 foot intervals:
  - an emergency telephone system
  - A local manual alarm system, or
  - An approved alarm initiating device
- Service corridors shall have at least one emergency alarm device in each

---

---

---

---

---

---

---

---

Slide 39

### H-5 occupancies (semiconductor facilities)

- Shall have a manual fire alarm system throughout the building
- Emergency power shall be provided:
  - HPM exhaust and gas systems
  - Emergency alarm systems
  - Manual and automatic fire alarm systems
  - Electrically operated systems required for HPM safety

---

---

---

---

---

---

---

---

---

---

Slide 40



---

---

---

---

---

---

---

---

---

---

Slide 41

### 907 Fire protection systems

- Construction documents shall be provided prior to installation
- Systems and their components shall be listed and approved for the purpose for which they are installed

---

---

---

---

---

---

---

---

---

---

Slide 42

### 707.8.1 elevator shafts

- Penetrations other than those necessary for the purpose of the shaft shall not be permitted in shaft enclosures
  - Cannot use the elevator shaft as a convenient path from floor to floor
  - Cannot place a box on the room-side of the wall if it penetrates the enclosure wall
  - Cannot run inside the enclosure wall

---

---

---

---

---

---

---

---

Slide 43

### 712 Through Penetrations of rated walls

- Sleeves shall be securely fastened to the assembly penetrated
- If steel conduit, annular space may be sealed with:
  - Concrete, grout or mortar in concrete and masonry walls
  - Other type walls, shall meet requirements of ASTM E119 to prevent passage of flame and hot gasses
- Through penetration firestop systems shall meet ASTM E 814 or UL 1479

---

---

---

---

---

---

---

---

Slide 44

### 712.3.2 Electrical outlet boxes membrane penetrations:

- In fire rated wall assemblies, steel boxes:
  - The aggregate area of all such openings does not exceed 100 square inches in any 100 square feet of wall area
  - Outlet boxes shall not exceed 16 square inches
  - Outlet boxes on opposite sides of the assembly shall be separated by:
    - a horizontal distance of not less than 24 inches
    - depth of the wall cavity when filled with cellulose, rockwool or mineral wool insulation
    - Solid fireblocking
    - Putty pads
    - Other listed methods

---

---

---

---

---

---

---

---

Slide 45

### Steel electrical boxes in fire walls

Exceptions allowed for fire-wrap on boxes or fire-rated separation assemblies (boxing in)

Must separate boxes 24 inches horizontally if on opposite sides

Back-to-back not permitted over 16 sq. in. not permitted

OK

Maximum 100 square inches on a side for every 100 square feet of area

---

---

---

---

---

---

---

---

---

---

Slide 46

### 712.3.2 Electrical outlet boxes membrane penetrations:

- Plastic or fiberglass boxes:
  - Listed for the purpose
  - boxes on opposite sides of the wall separate by :
    - 24 inches
    - Solid fireblocking
    - Putty pads
    - Other listed means

---

---

---

---

---

---

---

---

---

---

Slide 47

### 907 Fire Alarm Systems

- Manual FA systems are required in :
  - Use group A with 300 or more occupants
    - Manual FA boxes not required if sprinklered throughout and flow will activate the alarm
    - Emergency power source shall be provided for emergency voice/alarm system
  - Use group B with 500 or more occupants or more than 100 above or below the lowest level of exit discharge
    - Manual FA boxes not required if sprinklered throughout and flow will activate the alarm

---

---

---

---

---

---

---

---

---

---



Slide 48



Slide 49

## 907 Fire Alarm Systems

- Manual FA systems are required in :
  - Use group E
    - If sprinklers or smoke detectors are installed, they shall be interconnected to the fire alarm system
    - Exceptions:
      - Occupant load less than 50
      - Manual FA boxes not required with all of these:
        - » Interior corridors are protected by smoke detectors
        - » Auditoriums, cafeterias, shops, etc are protected by heat detectors
        - » Odor premises activation is provided
        - » Central point activation of the evacuation signal is provided
        - » 2-way communication is provided between normally occupied spaces and a constantly attended receiving station



Slide 50

## 907 Fire Alarm Systems

- Use group F
  - A manual FA system is required if:
    - 2 or more stories in height, and
    - Has 500 occupants above or below the lowest level of exit discharge
- Use group H
  - H-5 and manufacturers of organic coatings
    - A manual FA system is required
  - An automatic smoke detection system shall be installed for highly toxic gases, organic peroxides and oxidizers

Slide 51

907 Fire Alarm Systems

- Use group I
  - A manual FA system shall be installed in all use group I occupancies
    - Exception for I-1 and I-2 for manual FA boxes at exits in patient sleeping areas if boxes are visible and accessible at all nurses stations
  - An automatic fire detection system shall be installed
  - Waiting areas open to corridors shall also have an automatic smoke detection system, with electrical supervision

---

---

---

---

---

---

---

---

Slide 52

907 Fire Alarm Systems

- Use group I-2
  - Corridors in nursing homes, detox facilities and spaces open to the corridors shall be equipped with an automatic fire detection system
    - Exceptions for smoke compartments containing patient sleeping rooms:
      - if sleeping units have smoke detectors with audible and visual alarm at nurses station, or
      - If sleeping unit doors are equipped with automatic door closing devices and unit smoke detectors

---

---

---

---

---

---

---

---

Slide 53

907 Fire Alarm Systems

- Use group I-3 (prisons and jails)
  - I-3 occupancies shall be equipped with a manual and automatic fire alarm system installed for alerting staff
    - Presignal systems shall not be used
    - Manual FA boxes shall be permitted to be omitted or locked
  - A smoke detection system shall be installed throughout resident housing areas
    - Exception for sleeping units with 4 or fewer occupants if smoke compartment is sprinklered

---

---

---

---

---

---

---


---

Slide 54

### 907 Fire Alarm Systems

- Use group M
  - A manual FA system shall be installed
- Exceptions:
  - Covered mall buildings complying with 402
  - Occupant load less than 500 and no more than 100 above or below the lowest level of exit discharge

A single manual fire alarm box is permitted if the building is equipped throughout with automatic sprinklers with flow alarm tie



---

---

---

---

---

---

---

---


---

---

Slide 55

### 907 Fire Alarm Systems

- Use group R-1 (hotels and motels)
  - A manual FA system shall be installed
- Exceptions:
  - Not over two stories with 1 hour unit separations and exit directly to public way, exit court or yard
  - Manual FA boxes not required if:
    - » Automatic sprinklers throughout building
    - » Sprinkler flow tied to alarm
    - » At least one manual FA box



---

---

---

---

---

---

---

---

---

---

Slide 56

### 907 Fire Alarm Systems

- Use group R-1 (hotels and motels)
  - An automatic FA system shall be installed throughout all interior corridors serving guestrooms
- Exception if there are no interior corridors and each guestroom has a MOE door leading directly to an exterior exit access that leads directly to an exit

---

---

---

---

---

---

---

---

---

---

Slide 57

907 Fire Alarm Systems

- Use group R-1 (hotels and motels)
  - Single or multiple station smoke alarms
    - In sleeping areas
    - In every room in the path of the means of egress
    - In each story within the sleeping room, including basements
  - Smoke alarms shall be connected to an emergency power source
    - Exception if building is equipped throughout with sprinklers
  - Alarm to be annunciated at a constantly attended location from which the fire alarm system can be activated manually

---

---

---

---

---

---

---

---

Slide 58

907 Fire Alarm Systems

- Use group R-2 (apartments)
  - A manual fire alarm system shall be installed where:
    - Any dwelling or sleeping unit is 3 or more stories above the lowest level of exit discharge, or
    - Any dwelling or sleeping unit is more than one story below the highest level of exit discharge, or
    - The building contains more than 11 dwelling or sleeping units

---

---

---

---

---

---


---

---

Slide 59

907 Fire Alarm Systems

- Use group R-2 (apartments)
  - A manual FA system shall be installed
    - Exceptions:
      - Not over two stories with 1 hour unit separations and exit directly to public way, exit court or yard
      - Manual FA boxes not required if:
        - Automatic sprinklers throughout building
        - Sprinkler flow tied to alarm
        - At least one manual FA box



---

---

---

---

---

---

---

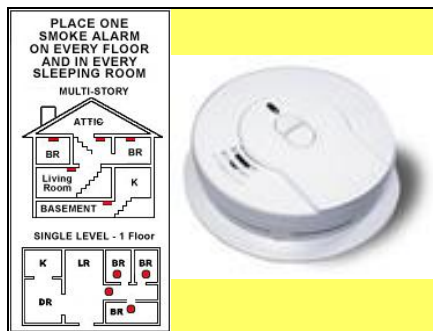
---

Slide 60

### Single and multiple station smoke alarms

- Listed smoke alarms shall be installed in accordance with NFPA 72
- In groups R-2, R-3, R-4, and I-1
  - On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of the bedrooms
  - In each room used for sleeping
  - In each story within a dwelling unit
    - Including basements
      - On upper level of split-level if no door
  - Exception I-1: smoke alarms not required if building is equipped throughout with an automatic fire detection system
  - AC/DC power supply
  - interconnected alarms

Slide 61



Slide 62

### 907.2.23 Battery Rooms

- An approved automatic smoke detection system shall be installed in areas containing stationary lead-acid battery systems having a liquid capacity of more than 50 gallons
- The alarm will sound at a constantly attended location

Slide 63

### 907 Fire Alarm Systems

- Manual fire alarm boxes
  - located not more than 5 feet from entrance to each exit
  - Travel distance to nearest box not to exceed 200 feet
  - located between 42 and 48 inches above floor
  - shall be red in color

---

---

---

---

---

---

---

---

Slide 64



---

---

---

---

---

---

---

---

Slide 65

### 907 Fire Alarm Power and Wiring

- All wiring shall be to NFPA 72
- Alarm notification appliance shall be automatically activated by:
  - Required automatic fire alarm system
  - sprinkler water flow devices
  - manual fire alarm boxes

---

---

---

---

---

---

---

---

Slide 66



---

---

---

---

---

---

---

---

Slide 67

**NFPA 72, Chapter 11**  
**Household Fire Alarm Systems**

- Applies to:
  - One and two family dwellings
  - Sleeping rooms of rooming houses
  - Dwelling units in apartments
  - Guest rooms and living areas of hotels
  - Dorm rooms
  - Day care homes
  - Residential board and care facilities

---

---

---

---

---

---

---

---

Slide 68

**NFPA 72, Chapter 11**  
**Household Fire Alarm Systems**

- Power supplies shall be able to sound an alarm for 4 minutes minimum
- There shall be AC and DC power
  - AC power shall be commercial power
  - AC power shall have no switch or GFCI
  - DC power shall be a battery
  - AC power shall have a visible indicator
  - Loss of or restoration of power shall not cause an alarm signal longer than 2 sec.

---

---

---

---

---

---

---

---

Slide 69

**NFPA 72, Chapter 11**  
**Household Fire Alarm Systems**

- All devices and equipment to be listed
- Required smoke detection to be
  - Via smoke alarms
  - Via smoke detection devices
- Audible alarm: 15 db above ambient sound levels and 5 db above maximum
  - Measured at pillow level in sleeping areas
  - Measured at 5 feet above the floor in public areas

---

---

---

---

---

---

---

---

Slide 70

**NFPA 72, Chapter 11**  
**Household Fire Alarm Systems**

- Installation
  - Shall be installed in accordance with manufacturer's instructions
  - Equipment to be mounted independently from attachment to wires
  - Location and mounting shall be such that accidental operation is not caused by vibration or jarring

---

---

---

---

---

---

---

---

Slide 71

**NFPA 72, Chapter 11**  
**Household Fire Alarm Systems**

- The supplier or installer shall provide:
  - instruction book
  - instruction charts describing operation, testing and maintenance
  - printed information for household evacuation plan
  - printed information for repair or replacement services, including where and how parts requiring regular replacement can be obtained

---

---

---

---

---

---

---

---



Slide 72

### NFPA 72, Chapter 11 Household Fire Alarm Systems

- Interconnection of Detectors
  - limited to 12 smoke alarms in any one multiple station connection.
  - limited to 18 unsupervised detectors of all types
  - limited to 64 supervised detectors
  - interconnection that causes other alarms to sound is limited to an individual family living unit. Remote annunciation OK

---

---

---

---

---

---

---

---

Slide 73

### NFPA 72, Chapter 11 Household Fire Alarm Systems

- Location of smoke detectors
  - locate detector on high side of sloped (greater than one in eight) ceilings
  - detectors in stairwells not to be blocked by doors or other obstruction
  - basement and lower floor detectors shall be close to stairway leading to upper floors
  - clearance of 4 inches from ceiling or wall
  - detectors not to be installed :
    - in kitchens or garages or unheated areas
    - within 3 feet from kitchen or bathroom door
    - within 3 feet from HVAC registers

---

---

---

---

---

---

---

---

Slide 74



---

---

---

---

---

---

---

---

Slide 75

### NFPA 72, Protected Premises Fire Alarm Systems

- Elevators
  - Recall of elevators are activated by smoke detectors in:
    - Elevator lobby
    - Elevator hoistways
    - Elevator machine room
  - smoke detectors shall not be installed in elevator hoistways unless sprinklers are also installed at the top of the shaft
    - Unless they activate smoke relief in hoistway
  - where ambient conditions prohibit installation of automatic smoke detection, other appropriate automatic detection shall be permitted (i.e. heat detectors)

---

---

---

---

---

---

---

---

Slide 76

### NFPA 72, Protected Premises Fire Alarm Systems

- Elevator shutdown
  - heat detectors used to shutdown elevators
    - shall have setting lower than and more sensitive than the sprinkler head
    - shall be installed within 2 feet of the sprinkler
- Activation of the building evacuation alarm is not required for smoke detectors installed in:
  - elevator lobbies
  - elevator hoistways
  - elevator machine rooms

---

---

---

---

---

---

---

---

Slide 77

### NFPA 72, Protected Premises Fire Alarm Systems

- Door unlocking devices
  - Emergency exits shall be connected to the FA system if electrically locked
  - All such exits shall unlock when FA system alarms
  - All such exits shall unlock upon loss of primary power to the FA system
  - The secondary power supply shall not be used to maintain these doors in locked condition

---

---

---

---

---

---

---

---

Slide 78

## 907.7 presignal systems

- Presignal systems shall not be installed unless approved by the building official and the fire department
- 24-hour personnel supervision shall be provided at a location approved by the fire department
  - To activate the alarm signal in the case of a fire or emergency

Slide 79



Slide 80

### 907.9 Alarm notification

- Visible alarm notification shall be provided in public and common areas
- Occupancy groups I-1 and R-1 sleeping units shall have visible alarm notification appliances per Table 907.9.1.3
  - Activated by both in-room smoke alarm and the building fire alarm system



Slide 84

907.11 Duct smoke detectors

- Shall be connected to the building's fire alarm control panel when a fire system is provided
- Alarm shall initiate an alarm at a constantly attended location
  - Or activate the building's fire alarm directly
- Duct smoke detectors shall not be used as a substitute for required open-area detection

---

---

---

---

---

---

---

---

Slide 85

908 Emergency Alarms

- Group H occupancies
  - Gas detection alarms shall be both visible and audible, inside and outside the area
    - shall also transmit a signal to a constantly attended location
  - Shall automatically close the shutoff valve on gas supply piping

---

---

---

---

---

---

---

---

Slide 86

909 Smoke Control Systems

- Smoke control power systems shall be supplied with two sources of power
  - Primary power shall be the normal building power
  - Secondary power shall be an approved standby source
    - Both source and transfer switch shall be in a separate room
- All wiring shall be in continuous raceways
- A fire-fighter's smoke control panel shall be provided

---

---

---

---

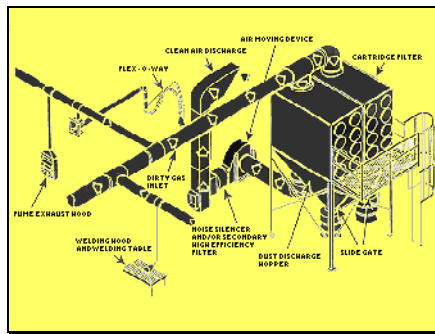
---

---

---

---

Slide 87



Slide 88

## 910 Smoke and Heat Vents

- Where approved by the BO, engineered mechanical smoke exhaust shall be an acceptable alternate to smoke and heat vents
- Controls shall be accessible to the fire department from the exterior of the building

Slide 89



Slide 90

## Means of Egress

- MOE, including the exit discharge shall be illuminated at all times the building is occupied
  - Exceptions:
    - Utility buildings
    - Aisle accessways in group A
    - Dwelling and/or sleeping units R-1, 2, 3
    - Sleeping units group I
  - Minimum lighting level of 1 foot candle at the floor
    - Exception in auditoriums to .2 foot candles

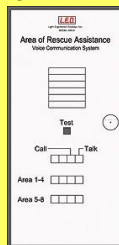
Slide 91



Slide 92

## 1007 Accessible MOE

- Areas of refuge shall have two way communication system
  - Between the area of refuge and a central control point manned 24 hours, or
  - Controlled access to a public telephone



Slide 93

1008 Powered doors

- Where MOE doors are power operated, they shall be capable of being manually opened in the event of a power failure
  - Exception:
    - I-3 occupancies (prisons)

---

---

---

---

---

---

---

---

Slide 94



---

---

---

---

---

---

---

---

Slide 95

1008 Delayed egress locks

- Permitted in occupancies except groups A, E and H
- Doors shall unlock when:
  - Sprinkler system is activate
  - Power is lost
  - Signal from the fire control center
  - 15 or 30 seconds after release latch is activated at the door
- Emergency lighting shall be provided at the door

---

---

---

---

---

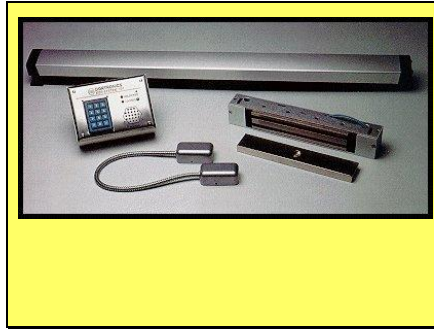
---

---

---



Slide 96



---

---

---

---

---

---

---

---

Slide 97

1011 **EXIT** Signs and Lights

- Required
  - where more than one exit is required
  - where necessary shall be supplemented by directional signs in the exit access corridors
- Located
  - at exit doors
  - at exit access areas
- Shall be readily visible

---

---

---

---

---

---

---

---

Slide 98



---

---

---

---

---

---

---

---

Slide 99

### 1011 **EXIT** Signs and Lights

- Exceptions:
  - Main exterior exit doors which are obviously and clearly identified as exits are not required to have **EXIT** signs where approved
  - **EXIT** signs are not required in sleeping areas in occupancies in Use Group I-3

---

---

---

---

---

---

---

---

Slide 100

### 1011 **EXIT** signs and lights

- All **EXIT** signs shall be illuminated at all times
  - Internally or externally illuminated
  - Shall be capable of 90 minute illumination after loss of primary power source.
  - Exception: self-luminous signs with continuous illumination independent of external power sources are excluded from emergency power requirements

---

---

---

---

---

---

---

---

Slide 101



---

---

---

---

---

---

---

---

Slide 102

### 1011.1.1 Floor Proximity

- In addition for
  - A more than 300
  - B medical, I-1, I-2
  - R-1 hotels and motels
  - R-2 dormitories
- Floor proximity exit sign required
  - 6-18 inches off floor
  - 4 inches from door

---

---

---

---

---

---

---

---

Slide 103

### 1019 Vertical Exit Enclosures

- Penetrations into and openings through an exit enclosure are prohibited
  - Exception for required raceways serving the exit enclosure
  - Must terminate at a steel box no larger than 16 sq. in.

---

---

---

---

---

---

---

---

Slide 104

### 1205 Artificial Light

- Artificial light shall be capable of providing an average illumination of 10 foot-candles over the area of the room at a height of 30 inches above the floor
- All stairways within dwelling units and exterior stairways serving a dwelling shall be provided with an illumination of 1 foot-candle measured at every tread nosing.

---

---

---

---

---

---

---

---

Slide 105

1301 Energy Efficiency

- Buildings shall be designed in accordance with the International Energy Conservation Code
  - IECC 701.1 commercial buildings shall meet the requirements of ASHRAE/IESNA 90.1 or chapter 8, Design by Acceptable Practice

---

---

---

---

---

---

---

---

Slide 106

2702 Emergency and Standby Power Systems

- Shall be installed to:
  - NFPA 70, National Electrical Code
  - NFPA 110, Emergency and Standby Power Systems
- and
- NFPA 111, Stored Electrical Energy Emergency and Standby Power Systems

---

---

---

---

---

---

---

---

Slide 107

Emergency power

- Shall be provided for:
  - Voice communication systems in group A occupancies
  - Exit signs
  - MOE illumination
  - Semiconductor fabrication facilities
  - Hazardous materials
  - Toxic materials
  - Pyrophoric materials
  - High rise buildings
  - Underground buildings
  - Doors in I-3 occupancies

---

---

---

---

---

---

---

---

Slide 108

### Standby Power

- Shall be provided for:
  - Accessible MOE elevators
  - Horizontal sliding doors
  - Membrane structures
    - inflation systems
  - Hazardous materials
  - Organic peroxides
  - Voice/alarm communication systems in covered mall buildings
  - Airport traffic control towers
  - Elevators
  - Smokeproof enclosures

---

---

---

---

---

---

---

---

Slide 109



---

---

---

---

---

---

---

---

Slide 110

### 3003 Elevators

- Standby power shall be manually transferable to all elevators in each bank
  - Where only one elevator is installed, transfer of power shall be automatic
  - Where two or more elevators are installed:
    - All elevators shall automatically transfer to standby power in sequence for recall if power is insufficient to operate all elevators

---

---

---

---

---

---

---

---

Slide 111

### 3003 Elevators

- Standby power shall be provided to machine room ventilation or air conditioning if standby power is provided to the elevator
- Shunt trip of the main line power supply to affected elevators shall be provided prior to application of water from sprinklers

---

---

---

---

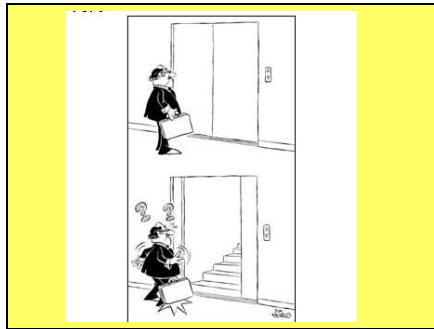
---

---

---

---

Slide 112



---

---

---

---

---

---

---

---

Slide 113

### 3102 Membrane Structures

- Air supported and air-inflated structures over 1,500 square feet:
  - Shall be provided with primary and auxiliary inflation systems
  - Standby power shall be provided
    - Shall be capable of 4 hours of operation

---

---

---

---

---

---

---

---

Slide 114



---

---

---

---

---

---

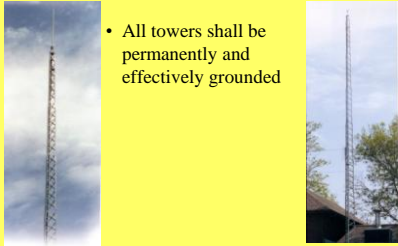
---

---

Slide 115

3108 Radio and Television Towers

- All towers shall be permanently and effectively grounded

Two tall radio and television towers against a cloudy sky.

---

---

---

---

---

---

---

---

Slide 116

3109 Swimming pool enclosures

- Where the wall of a dwelling unit serves as a barrier to a swimming pool:
  - Doors with direct access to the pool shall be equipped with an alarm that sounds throughout the dwelling when door and its screen are opened, or
  - The pool shall be equipped with a power safety cover, or
  - Doors shall be self closing and latching

---

---

---

---

---

---


---

---

Slide 117

### 3310 During Construction

- When a building is constructed to over 50 feet in height:
  - At least one temporary lighted stairway shall be provided



---

---

---

---

---

---

---

---

Slide 118

### Questions????



---

---

---

---

---

---

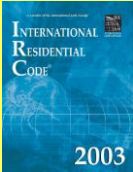
---

---

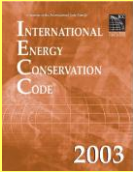
Slide 119

### 2003 Electrical Energy Code Requirements

- 2003 IRC



- 2003 IECC



---

---

---

---

---

---

---

---



Slide 120

## IRC Chapter 11

N1101.2.1 & 2 allows compliance by meeting the requirements of Chapter 11, or

By meeting the requirements of The IECC

The electrical requirements are as summarized here:

---

---

---

---

---

---

---

---

---

---

Slide 121

## 502.1.3 Recessed lighting Fixtures



---

---

---

---

---

---

---

---

---

---

Slide 122

## 502.1.4.2 Caulking and sealants



---

---

---

---

---

---

---

---

---

---

Slide 123

### 503.3.2 Temperature and humidity controls



---

---

---

---

---

---

---

---

Slide 124

### 503.3.2.1 System controls

#### 503.3.2.2 Thermostatic control capabilities



---

---

---

---

---

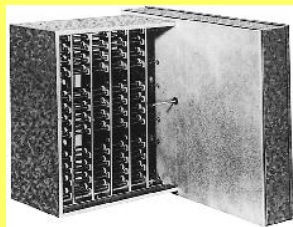
---

---

---

Slide 125

### 503.3.2.3 Heat pump auxiliary heat



---

---

---

---

---

---

---

---

Slide 126

#### 503.3.2.4 Humidistat



---

---

---

---

---

---

---

---

Slide 127

#### 504.2 Water heaters, storage tanks and boilers

##### 504.2.1 Performance efficiency.



---

---

---

---

---

---

---

---

Slide 128

#### 504.3 Swimming pools



---

---

---

---

---

---

---

---

Slide 129

504.3.1 On-off switch



---

---

---

---

---

---

---

---

Slide 130

504.3.2 Pool covers



---

---

---

---

---

---

---

---

Slide 131

504.3.3 Time clocks



---

---

---

---

---

---

---

---

Slide 132

#### 504.4 Hot water system controls



---

---

---

---

---

---

---

---

Slide 133

#### Section 505 Electrical Power and Lighting

- 505.1  
Electrical  
energy  
consumption



---

---

---

---

---

---

---

---

Slide 134

#### 505.2 Lighting power budget



---

---

---

---

---

---

---

---

Slide 135

## Chapter 6 Simplified Prescriptive Requirements for Detached One- and Two-Family Dwellings and Group R-2, R-4 or Townhouse Residential Buildings

Same as the IRC requirements

Slide 136

602.1.10 Caulking, sealants and gasketing N1102.1.10



Slide 137

602.1.12 Recessed lighting  
fixtures N1102.1.11



Slide 138

### Section 603 Mechanical Systems

- 603.1 Heating and air-conditioning equipment and appliances N1103.1



---

---

---

---

---

---

---

---

Slide 139

### Section 604 Service Water Heating

- 604.1 Water-heating equipment and appliances N1104.1



---

---

---

---

---

---

---

---

Slide 140

### State of Connecticut Accessible Electric



Office of The State Building Inspector  
Office of Education and Data Management

**The State Building Code**

---

---

---

---

---

---

---

---

Slide 141

The State of Connecticut  
Building Code

**Department of Public Safety**

**Division of Fire, Emergency and  
Building Services**

**Office of the State Building  
Inspector**

**Office of Education and Data  
Management**

---

---

---

---

---

---

---

---

Slide 142

Electrical Requirements for  
Accessible Buildings

- Reference Texts:
  - ICC/ANSI A117.1-1998
  - 1999 Connecticut Supplement
  - 1996 BOCA National Building Code
  - 1995 CABO One and Two Family Dwelling Code

---

---

---

---

---

---

---

---

Slide 143

Electrical Requirements for  
Accessible Buildings

Minimum Receptacle Height  
(or any device)

Unobstructed  
reach

ANSI A117.1  
Section 308



15 inch  
minimum

---

---

---

---

---

---

---

---



Slide 144

# Electrical Requirements for Accessible Buildings

Minimum receptacle height  
(or any device)

Unobstructed  
low forward reach

ANSI A117.1  
Section 308



The diagram shows a black silhouette of a person in a wheelchair reaching forward to a brown wall-mounted receptacle. A yellow arrow points from the person's hand to the receptacle. To the right of the receptacle, a vertical dimension line indicates a height of 15 inches minimum.

---

---

---

---

---

---

Slide 145

# Electrical Requirements for Accessible Buildings

Maximum switch height  
(or any device)

Unobstructed side reach

ANSI A117.1

Section 308

48 inch maximum

Exception:  
existing  
elevators  
allowed up to  
54 inches

---

---

---

---

---

---

Slide 146

# Electrical Requirements for Accessible Buildings

Maximum switch height  
(or any device)

Unobstructed front reach

ANSI A117.1  
Section 308

The diagram shows a person in a wheelchair reaching for a switch on a wall. A vertical dimension line indicates the maximum reach height is 48 inches. The text 'ANSI A117.1 Section 308' is also present.

---

---

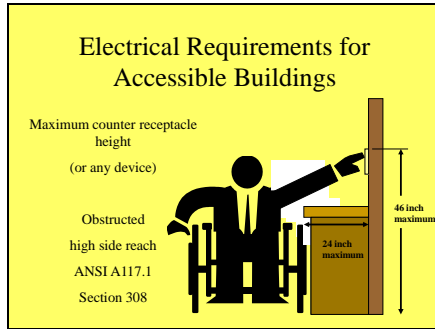
---

---

---

---

Slide 147



---

---

---

---

---

---

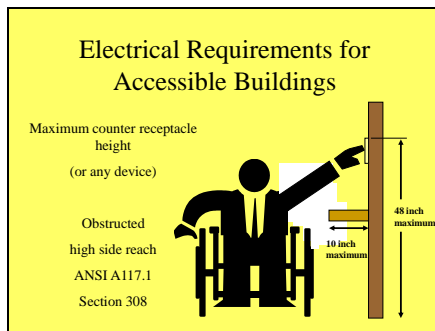
---

---

---

---

Slide 148



---

---

---

---

---

---

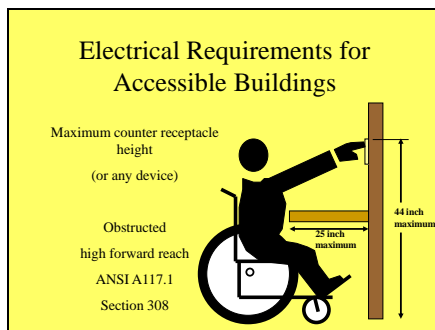
---

---

---

---

Slide 149



---

---

---

---

---

---

---

---

---

---

Slide 150



Slide 151

### CT Supplement BOCA

- (Add) 1106.3 Automatic Entrances
  - CGS 29-270a
  - At least one primary entrance to any covered mall building, anchor store or retail business with more than 50,000 sq. ft. of floor space shall be equipped with an automatic operating door (or doors in sequence)
  - Not required if doors are open and unobstructed during hours of operation

Slide 152

### BOCA

- BOCA 1007.3 Elevators
  - At least one elevator shall be provided if:
    - required accessible floor is four or more stories above or below a level of exit discharge
    - it shall serve as one of the required accessible means of egress
  - An accessible elevator shall comply with:
    - Section 3006.0 Power Elevator Requirements
    - Section 2707.0 Standby Power Systems
    - Section 1007.5 Area of Refuge

Slide 153

CT Supplement

- BOCA 1007.3 Elevators
  - Exceptions:
    - If building fully sprinklered:
      - area of refuge or horizontal exit not required for elevator access
    - Elevator not required if also:
      - » the required accessible floors located at or above level of discharge, and
      - » such floors provided with a horizontal exit
  - BOCA 1007.4 Platform lifts shall not serve as part of an accessible means of egress (except in a dwelling unit)

---

---

---

---

---

---

---

---

Slide 154

CT Supplement Additions

- BOCA 1108.13 Telephones, where provided, shall have 1/4 of the total number accessible, but no less than one
- BOCA 1108.14 Automatic Teller Machines, where provided shall have at least one be accessible

---

---

---

---

---

---

---

---

Slide 155

Accessible Public Telephones  
A117.1

- 704.2.2 Telephones shall have push button controls where available
- 704.2.4 Accessible phones shall have a cord length of 29 inches minimum
- 704.2.5 Telephones shall be hearing-aid compatible
- Care must be taken to ensure that telephone enclosures do not protrude into the circulation path (see Art. 307)

---

---

---

---

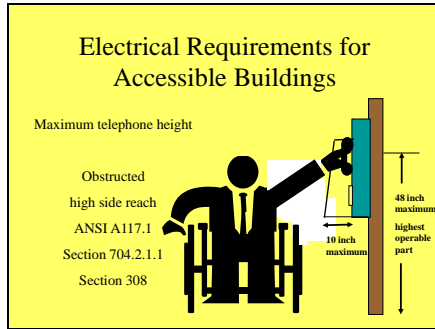
---

---

---

---

Slide 156



---

---

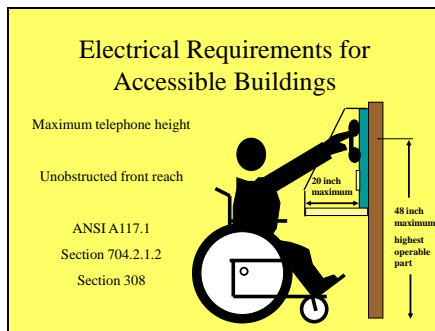
---

---

---

---

Slide 157



---

---

---

---

---

---

Slide 158

# Automatic Teller Machines

## A117.1-707

- Machines shall provide both audible and visual instructions
  - audible may be provided via a standard audio mini jack, handset or other such readily available device
  - video display screen shall be visible from a point 40 inches above the center of the front of the machine

---

---

---

---

---

---

Slide 159

### Accessible Fire Alarm Systems

- A 117.1-702
  - Accessible fire alarm systems shall have audible alarms and visual alarms
  - Exception:
    - In medical care facilities, shall be permitted to be modified to suit standard health care alarm practice

---

---

---

---

---

---

---

---

Slide 160

### Audible Alarms

- ICC/ANSI A117.1 Section 702.2
  - Audible Alarms shall exceed average room ambient sound levels by 15 dBA or maximum sustained level by 5 dBA, whichever is louder, but never exceed 120 dBA.
  - Signal shall be “three pulse” temporal pattern where evacuation of the building is required

---

---

---

---

---

---

---

---

Slide 161

### Visual Alarms A117.1 Section 702.3

- Lamp shall be Xenon strobe or equal
- Color shall be clear or nominal white
- Flash rate shall be between 1 & 2 Hz
- Pulse duration shall be 0.2 seconds max.
- Wall mount shall be 80 to 96 inches AFF to bottom of appliance
  - smoke detector/appliance combos shall be 4 to 12 inches below ceiling to the top of the appliance
- Ceiling mount shall be maximum 30 feet

---

---

---

---

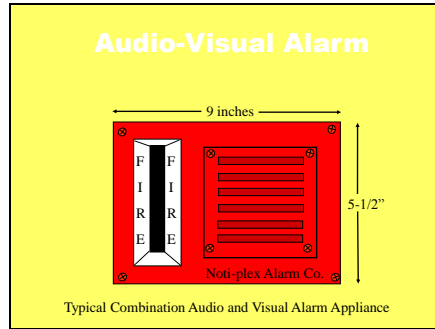
---

---

---

---

Slide 162



---

---

---

---

---

---

Slide 163

## Visual Alarms

- ICC/ANSI A117.1 Section 702.3.4
  - Spacing and Intensity
    - spacing shall be such that appliance signal is visible from any location in the room, either directly or by reflection
    - multiple appliances are permitted only when a single appliance won't cover the shape or area and will comply with one of the following:
      - A maximum of 2 appliances on opposite walls
      - All appliances have synchronized flashes, or
      - In rooms larger than 80x80 feet, spaced 55 feet min.

---

---

---

---

---

---

Slide 164

## Visual Alarms

- ICC/ANSI A117.1 Section 702.3.5
  - Corridors over 20 feet wide comply with prior standard 702.3.4
  - Corridors 20 feet wide max.:
    - Appliances 15 feet max. from each end
    - Appliances spaced 50-100 feet apart
    - Minimum effective intensity of 15 candelas

---

---

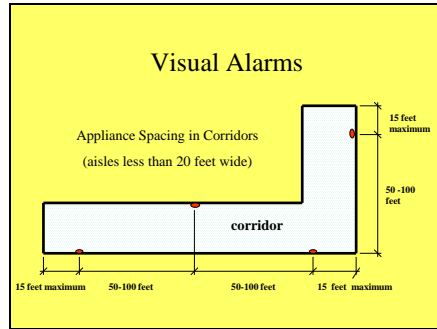
---

---

---

---

Slide 165



---

---

---

---

---

---

---

---

---


---

Slide 166

### Sleeping Rooms and Suites

#### A117.1-702.3.6

- Visual alarms are required inside sleeping rooms when:
  - single or multiple smoke detectors are provided in the sleeping room or suite
  - a building fire alarm system is provided
- Minimum effective intensity
  - Wall mounted appliances 24 inches below ceiling shall be 110 candela
  - Closer than 24 inches to ceiling or ceiling mounted shall be 177 candela
  - push for lesson on illumination



---

---

---

---

---

---

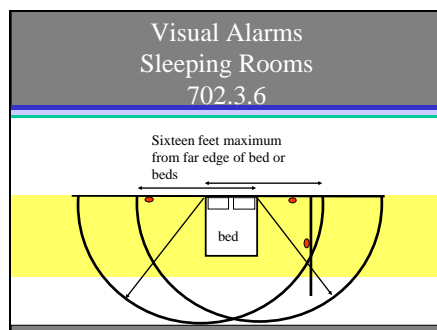
---

---

---

---

Slide 167



---

---

---

---

---

---

---

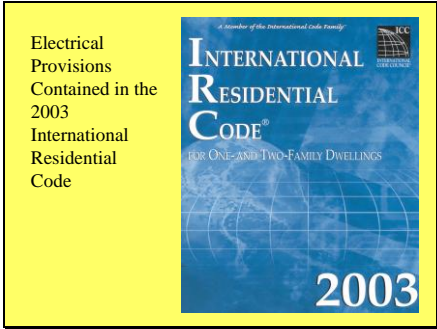
---

---

---



Slide 168



---

---

---

---

---

---

---

---

---

---

Slide 169

R105.2 Work exempt from permit



Only the replacement of lamps and cord connected equipment are exempt from permitting

---

---

---

---

---

---

---

---

---

---

Slide 170

R107.3 Temporary power



---

---

---

---

---

---

---

---

---

---

Slide 171

R109.1.2 Plumbing, mechanical, gas  
and electrical systems inspection



---

---

---

---

---

---

---

---

Slide 172

R111.1 Connection of service utilities



---

---

---

---

---

---

---

---

Slide 173

Section 303 Light ventilation and  
heating



---

---

---

---

---

---

---

---

Slide 174



---

---

---

---

---

---

---

---

Slide 175



---

---

---

---

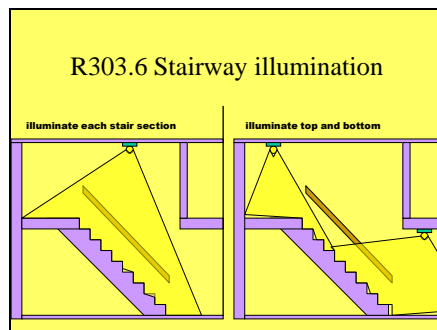
---

---

---

---

Slide 176



---

---

---

---

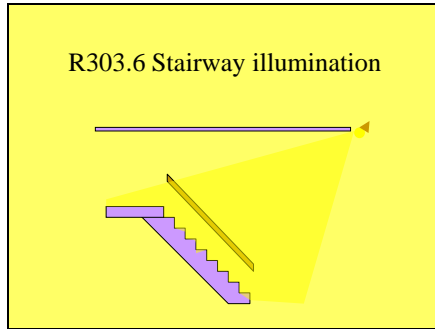
---

---

---

---

Slide 177



---

---

---

---

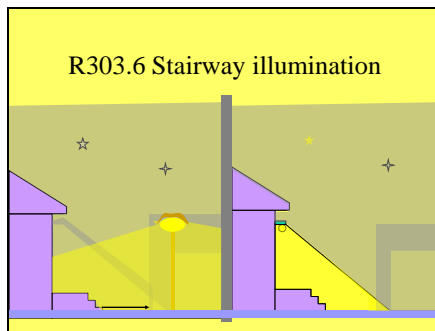
---

---

---

---

Slide 178



---

---

---

---

---

---

---

---

Slide 179



---

---

---

---

---

---

---

---

Slide 180



---

---

---

---

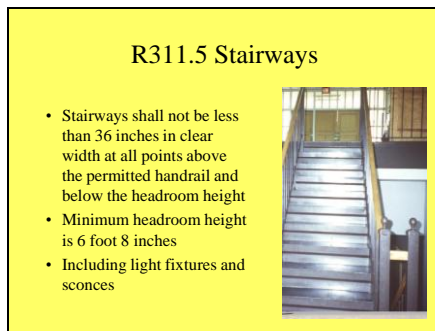
---

---

---

---

Slide 181



---

---

---

---

---

---

---

---

Slide 182



---

---

---

---

---

---

---

---

Slide 183

### R313.1 Smoke alarms



---

---

---

---

---

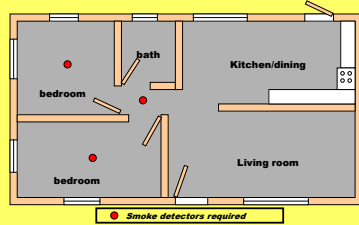
---

---

---

Slide 184

### R313.1.1 Alterations and additions



---

---

---

---

---

---

---

---

Slide 185

### R313.2 Power source



---

---

---

---

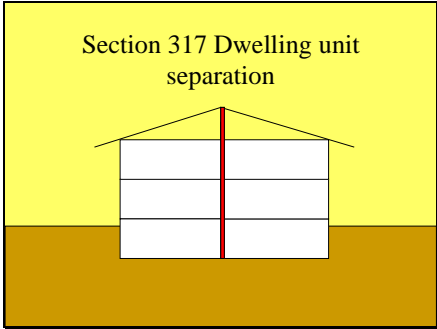
---

---

---

---

Slide 186



---

---

---

---

---

---

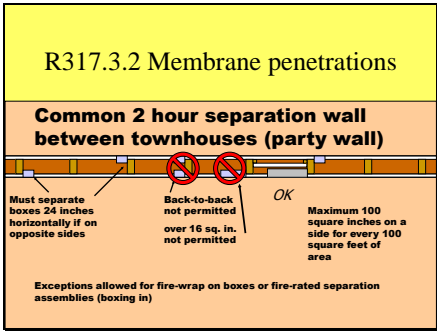
---

---

---

---

Slide 187



---

---

---

---

---

---

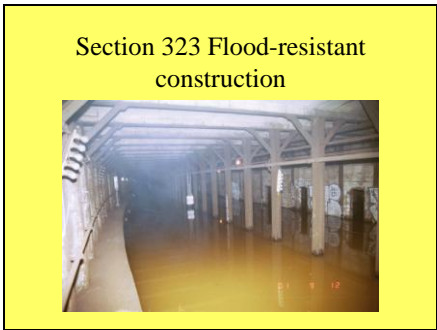
---

---

---

---

Slide 188



---

---

---

---

---

---

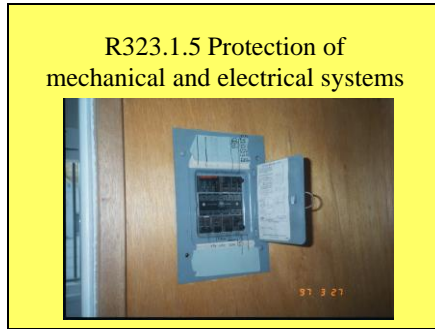
---

---

---

---

Slide 189



---

---

---

---

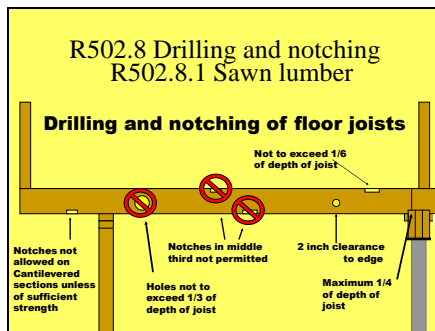
---

---

---

---

Slide 190



---

---

---

---

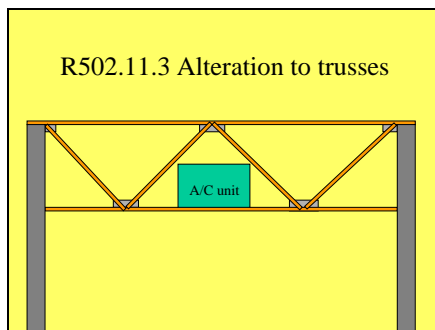
---

---

---

---

Slide 191



---

---

---

---

---

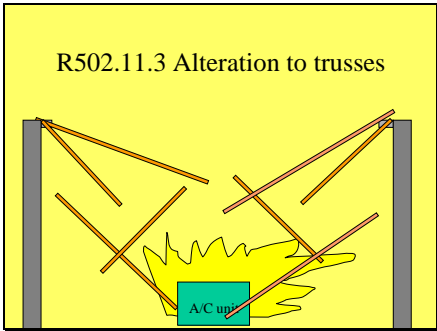
---

---

---



Slide 192



---

---

---

---

---

---

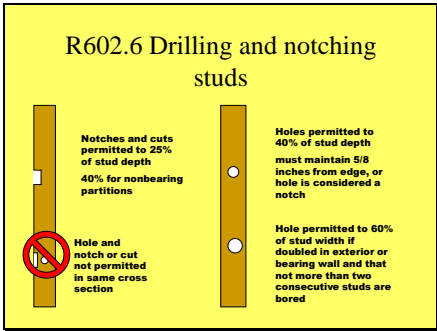
---

---

---

---

Slide 193



---

---

---

---

---

---

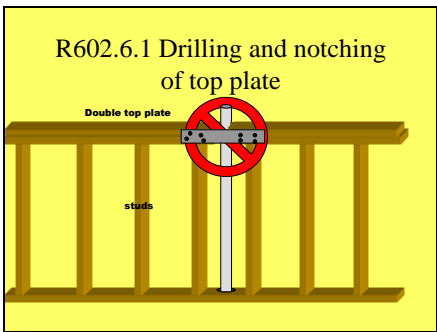
---

---

---

---

Slide 194



---

---

---

---

---

---

---

---

---

---

Slide 195



---

---

---

---

---

---

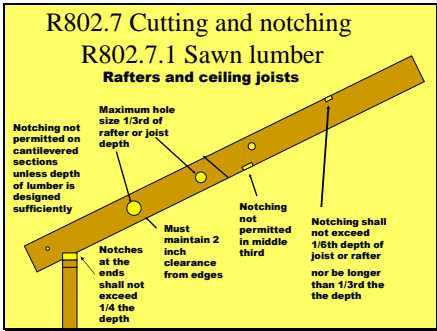
---

---

---

---

Slide 196



---

---

---

---

---

---

---

---

---

---

Slide 197



---

---

---

---

---

---

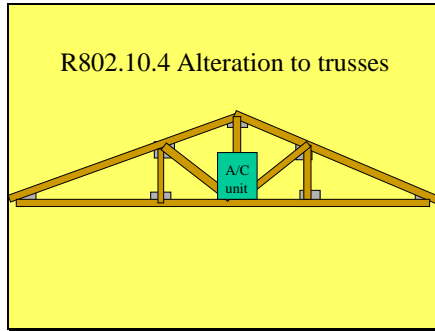
---

---

---

---

Slide 198



---

---

---

---

---

---

---

---

Slide 199



---

---

---

---

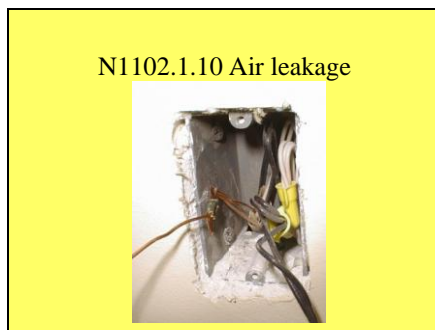
---

---

---

---

Slide 200



---

---

---

---

---

---

---

---

Slide 201



---

---

---

---

---

---

---

---

---

---

Slide 202



---

---

---

---

---

---

---

---

---

---

Slide 203



---

---

---

---

---

---

---

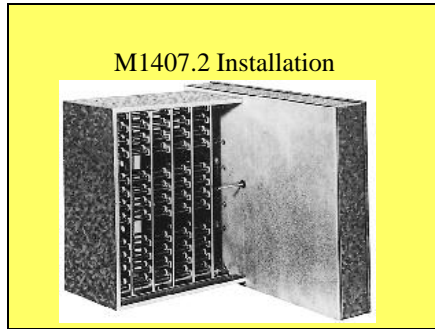
---

---

---



Slide 207



---

---

---

---

---

---

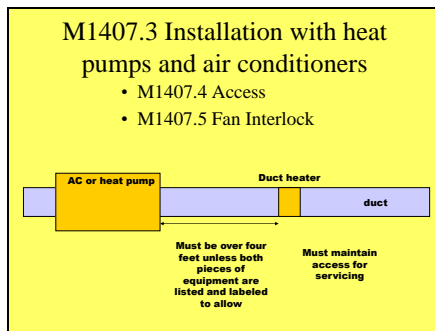
---

---

---

---

Slide 208



---

---

---

---

---

---

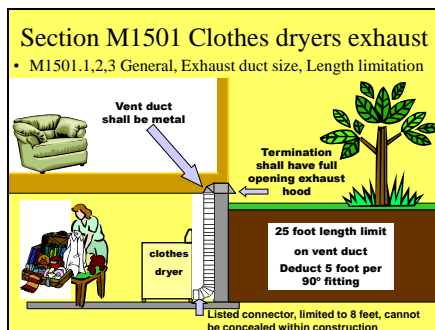
---

---

---

---

Slide 209



---

---

---

---

---

---

---

---

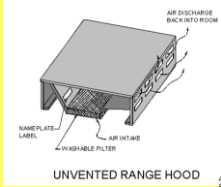
---

---

Slide 210

Section M1502 Range hoods

- M1502.1 General
- M1502.2 Duct material
- M1502.3 Kitchen exhaust rates



UNVENTED RANGE HOOD

---

---

---

---

---

---

---

---

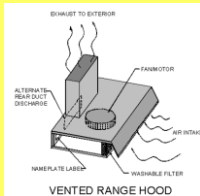
---

---

Slide 211

Section M1502 Range hoods

- M1502.1 General



VENTED RANGE HOOD

---

---

---

---

---

---

---

---


---

---

Slide 212

Section M1502 Range hoods

- M1502.2 Duct material
- M1502.3 Kitchen exhaust rates



---

---

---

---

---

---

---

---

---

---

Slide 213

**Section M1503 Installation of microwave ovens**

- M1503.1 Installation of microwave oven over a cooking appliance



---

---

---

---

---

---

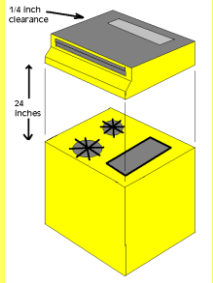
---

---

Slide 214

**Section M1504 Overhead exhaust hoods**

- M1501.4 General



---

---

---

---

---

---

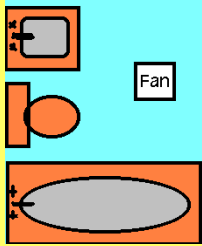
---

---

Slide 215

**Section M1506 Mechanical Ventilation**

- M1506.1 General
- M1506.2 Recirculation of air
- M1506.3 Ventilation rate



---

---

---

---

---

---

---


---



Slide 216

**Section G2410 (309) Electrical**

- G2410.1 (309.1) Grounding.
- G2410.2 (309.2) Connections.



---

---

---

---

---

---


---

---

Slide 217

**Section G2411 (310) Electrical Bonding**

- G2411.1 (310.1) Gas pipe bonding.



---

---

---

---

---

---


---

---

Slide 218

Chapters 33 through 42 are excerpted from the 2002 National Electrical Code

See Appendix L



---

---

---

---

---

---

---

---

Slide 219

Appendix G Swimming pools,  
spas and hot tubs



---

---

---

---

---

---

---

---

Slide 220

AG105.2 Outdoor swimming  
pool



---

---

---

---

---

---

---

---

Slide 221

Pool heaters



---

---

---

---

---

---

---

---

Slide 222



---

---

---

---

---

---

---

---

Slide 223



---

---

---

---

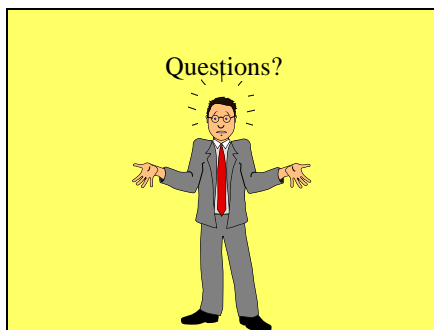
---

---

---

---

Slide 224



---

---

---

---

---

---

---

---